

PATENT COOPERATION TREATY

From the:
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

22 DEC 2005

PCT

NOTIFICATION OF TRANSMITTAL OF
INTERNATIONAL PRELIMINARY
REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Rule 71.1)

Date of mailing
(day/month/year) 21 DEC 2005

To:

Davies Collison Cave
Level 15
1 Nicholson Street
MELBOURNE VIC 3000

Applicant's or agent's file reference
12505520/DH/JPN/EJL

IMPORTANT NOTIFICATION

International application No.
PCT/AU2004/001296

International filing date (day/month/year)
22 September 2004

Priority date (day/month/year)
3 October 2003

Applicant

DA CRUZ, Joseph

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary report on patentability and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translations to those Offices.
4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary report on patentability. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the *PCT Applicant's Guide*.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed invention is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

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PATENT COOPERATION TREATY
PCT
INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 12505520/DH/JPN/EJL	<div style="display: flex; justify-content: space-between;"> <div>FOR FURTHER ACTION</div> <div>See Form PCT/IPEA/416</div> </div>	
International application No. PCT/AU2004/001296	International filing date (<i>day/month/year</i>) 22 September 2004	Priority date (<i>day/month/year</i>) 3 October 2003
International Patent Classification (IPC) or national classification and IPC Int. Cl. <i>A61C 7/08 (2006.01)</i>		
Applicant DA CRUZ, Joseph		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36. 2. This REPORT consists of a total of 3 sheets, including this cover sheet. 3. This report is also accompanied by ANNEXES, comprising:	a. <input checked="" type="checkbox"/> (<i>sent to the applicant and to the International Bureau</i>) a total of 12 sheets, as follows: <div style="margin-left: 20px;"> <input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions). <input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box. </div> b. <input type="checkbox"/> (<i>sent to the International Bureau only</i>) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or table related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).
4. This report contains indications relating to the following items:	
<div style="margin-left: 20px;"> <input checked="" type="checkbox"/> Box No. I Basis of the report <input type="checkbox"/> Box No. II Priority <input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability <input type="checkbox"/> Box No. IV Lack of unity of invention <input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement <input type="checkbox"/> Box No. VI Certain documents cited <input type="checkbox"/> Box No. VII Certain defects in the international application <input type="checkbox"/> Box No. VIII Certain observations on the international application </div>	

Date of submission of the demand 28 April 2005	Date of completion of this report 16 December 2005
Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustalia.gov.au Facsimile No. (02) 6285 3929	Authorized Officer XAVIER GISZ Telephone No. (02) 6283 2064

Box No. 1

Basis of the report

1. With regard to the **language**, this report is based on:
- ☒ The international application in the language in which it was filed
- ☐ A translation of the international application into _____, which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3(a) and 23.1 (b))
- ☐ publication of the international application (under Rule 12.4(a))
- ☐ international preliminary examination (Rules 55.2(a) and/or 55.3(a))
2. With regard to the **elements** of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):
- ☐ the international application as originally filed/furnished
- ☒ the description:
- pages **1, 5, 6, 8-12, 14-17** as originally filed/furnished
- pages* **2-4, 4A, 7, 7A, 13, 13A** received by this Authority on **2 August 2005** with the letter of 2 August 2005
- pages* _____ received by this Authority on _____ with the letter of _____
- ☒ the claims:
- pages _____ as originally filed/furnished
- pages* _____ as amended (together with any statement) under Article 19
- pages* **18-21** received by this Authority on **2 August 2005** with the letter of 2 August 2005
- pages* _____ received by this Authority on _____ with the letter of _____
- ☒ the drawings:
- pages **1/19 – 19/19** as originally filed/furnished
- pages* _____ received by this Authority on _____ with the letter of _____
- pages* _____ received by this Authority on _____ with the letter of _____
- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to the sequence listing (*specify*): _____
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to the sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims 1, 2, 5, 9, 12-17, 21-24	YES
	Claims 3, 4, 6-8, 10, 11, 18-20	NO
Inventive step (IS)	Claims 1, 2, 5, 9, 17, 21-24	YES
	Claims 3, 4, 6-8, 10-16, 18-20	NO
Industrial applicability (IA)	Claims 1-24	YES
	Claims	NO

2. Citations and explanations (Rule 70.7)

The following documents identified in the International Search Report have been considered for the purposes of this report:

D1.... JP 2002191623

D2.... US 4,299,568

D3.... US 3,967,379

Novelty (N) Claims 3, 4, 6-8, 10, 11, 18-20

Claims 3, 4, 6-8, 10, 11, 18-20: D1 discloses a dental retainer comprising a resin base (101) contoured to contact the inner surfaces of the teeth and an arch wire (104) making contact with the outer surfaces of the teeth. The arch wire extends from the C-clasp (100) around a posterior tooth on one side of the jaw to a symmetrically placed C-clasp on the other side. The arch wire includes U-loops (see figures). The retainer can be made for upper or lower jaw (see figures).

Claims 3, 6, 8: D2 discloses an orthodontic appliance for the upper jaw comprising a base (2) and arch wire (76) with a U-loop (78).

Similarly D3 discloses the features of 3, 6 and 8.

Inventive Step (IS) 3, 4, 6-8, 10-16, 18-20

Claims 3, 4, 6-8, 10, 11, 18-20 also lack an inventive step for the reasons given above.

Claim 12: The use of L-rests is considered common general knowledge in the field of orthodontic retainers and consequently lacks inventive step.

Claim 13: It would be considered common general knowledge to a person skilled in the art to make the base from an acrylic.

Claims 14-16: adding the feature of a bite plane to the base of an orthodontic retainer of D1 would be considered a mere workshop improvement to a PSA and consequently lacks inventive step.

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
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- ☐ the claims, Nos. _____
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- ☐ any table(s) related to the sequence listing (*specify*): _____

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Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
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1. Statement

Novelty (N)	Claims 1, 2, 5, 9, 12-17, 21-24	YES
	Claims 3, 4, 6-8, 10, 11, 18-20	NO
Inventive step (IS)	Claims 1, 2, 5, 9, 17, 21-24	YES
	Claims 3, 4, 6-8, 10-16, 18-20	NO
Industrial applicability (IA)	Claims 1-24	YES
	Claims	NO

2. Citations and explanations (Rule 70.7)

The following documents identified in the International Search Report have been considered for the purposes of this report:

D1.... JP 2002191623

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Claims 3, 6, 8: D2 discloses an orthodontic appliance for the upper jaw comprising a base (2) and arch wire (76) with a U-loop (78).

Similarly D3 discloses the features of 3, 6 and 8.

Inventive Step (IS) 3, 4, 6-8, 10-16, 18-20

Claims 3, 4, 6-8, 10, 11, 18-20 also lack an inventive step for the reasons given above.

Claim 12: The use of L-rests is considered common general knowledge in the field of orthodontic retainers and consequently lacks inventive step.

Claim 13: It would be considered common general knowledge to a person skilled in the art to make the base from an acrylic.

Claims 14-16: adding the feature of a bite plane to the base of an orthodontic retainer of D1 would be considered a mere workshop improvement to a PSA and consequently lacks inventive step.

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Amended Sheet
IPEA/AU

- 3 -

Preferably, the arch wire extends rearwardly relative to the posterior portions on each side of the base so as to allow limited movement of the arch wire relative to the base when the dental appliance is in use.

Preferably, the dental appliance is for an upper jaw of the wearer.

Preferably, when the dental appliance is in use, the arch wire extends continuously from a left side posterior portion of the base, outwardly behind a posterior tooth on the left side of the arch, forwardly along the outside left side of the arch, rightward along the outside front side of the arch, rearwardly along the outside right side of the arch, and inwardly behind a posterior tooth on the right side of the arch to a right side posterior portion of the base.

Preferably, the arch wire incorporates a plurality of U-loops. In one example, the arch wire incorporates four U-loops.

Preferably, the arch wire is provided with one or more C-clasps. More preferably, at least one of the C-clasps is coupled to the arch wire at only one end portion of the C-clasp.

Preferably, the arch wire is provided with one or more L-rests.

Preferably, the base is acrylic. Preferably, the base is provided with a bite plane. In one example the bite plane is an anterior bite plane. In an alternative example the bite plane is a posterior bite plane.

In accordance with another aspect of the present invention, there is provided a removable dental appliance having a base adapted for locating inside of an arch of teeth of a wearer and an arch wire coupled to the base, wherein an outer surface of the base is contoured for contact with inner surfaces of a set of teeth on one side of the wearer's jaw, when in use the arch wire extends around an outer periphery of the set of teeth such that no interconnection between the arch wire and the base exists intermediate the set of teeth, and the dental appliance has anterior wires or springs for urging forward anterior teeth of the wearer.

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In accordance with another aspect of the invention, there is provided a removable dental appliance having a base adapted for locating inside of an arch of teeth of a wearer and an arch wire coupled to the base, wherein an outer surface of the base is contoured for contact with inner surfaces of a set of teeth on one side of the wearer's jaw, and wherein when in use the arch wire extends around an outer periphery of the set of teeth such that no interconnection between the arch wire and the base exists intermediate the set of teeth.

Preferably, the arch wire extends continuously from a posterior portion of the base, outwardly behind a posterior tooth of said set of teeth, forwardly in contact with outer surfaces of said set of teeth, and inwardly in front of a front tooth of said set of teeth to the base.

Preferably, the removable dental appliance is for a lower jaw of the wearer.

Preferably, the base has a first lingual portion and an opposed second lingual portion, the first and second lingual portions being held apart by a resilient member, the first lingual portion is contoured for contact with inner surfaces of a first set of teeth on one side of the wearer's jaw and the second lingual portion is contoured for contact with inner surfaces of a second set of teeth on an opposite side of the wearer's jaw, and when in use, a first arch wire extends continuously from a posterior portion of the first lingual portion, outwardly behind a posterior tooth of said first set of teeth, forwardly in contact with outer surfaces of said first set of teeth, and inwardly in front of a front tooth of said first set of teeth to the first lingual portion, and a second arch wire extends continuously from a posterior portion of the second lingual portion, outwardly behind a posterior tooth of said second set of teeth, forwardly in contact with outer surfaces of said second set of teeth, and inwardly in front of a front tooth of said second set of teeth to the second lingual portion.

Preferably, each of the first and second arch wires is provided with one or more C-clasps. More preferably, at least one of the C-clasps is coupled to the arch wire at only one end portion of the C-clasp.

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Brief Description of the Drawings

Preferred embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of an underside (ie. the surface which in situ faces away from tissue of the upper jaw) of a dental appliance for an upper jaw;

Figure 2 is a perspective view of an upper surface (ie. the surface which in situ faces the tissue of the upper jaw) of the dental appliance shown in Figure 1;

Figure 3 is a front perspective view of the dental appliance shown in Figures 1 and 2;

Figure 4 is a top view of a dental appliance for an upper jaw;

Figure 5 is a side perspective view of an underside of the dental appliance shown in

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extends continuously from a left side posterior portion 24 of the base 12, outwardly (see reference numeral 25) behind a posterior tooth 26 on the left side of the arch 16, forwardly (see reference numeral 28) along the outside left side of the arch 16, rightward (see reference numeral 30) along the outside front side of the arch 16, rearwardly (see reference numeral 32) along the outside right side of the arch 16, and inwardly (see reference numeral 34) behind a posterior tooth 36 on the right side of the arch 16 to a right side posterior portion 22 of the base 12. The arch wire 14 also incorporates four U-loops 38 which may be adjusted to tailor the effect provided by use of the dental appliance 10. Although in other examples more than or less than four U-loops may be formed in the arch wire 14, the applicant has determined that four U-loops provides the arch wire 14 with an appropriate degree of flexibility whilst keeping good retention properties.

As the arch wire 14 extends rearwardly relative to the posterior portions 22, 24, spacing is achieved between the arch wire 14 and the base 12 so as to allow improved freedom of movement between the arch wire 14 and the base 12 during use. This assists in preventing too tight a fit which can cause tight locking of the maxilla and undue stress to the wearer. By promoting muscle relaxation in the wearer, clenching and other muscular movements detrimental to jaw alignment are avoided or at least reduced, and breathing is enhanced through improvement of the airway.

The enhanced freedom of movement of the arch wire 14 relative to the base 12 also facilitates a "spring fit" of the appliance, where it is snapped into place in a wearer's mouth. Advantageously, additional flexibility in the fit of the appliance is achieved, and greater scope is provided for adjustment of the appliance.

The dental appliance 10 shown in Figures 1 to 3 is also provided with a 3-way expansion screw mechanism 40 which has three expansion screws 42, 44, 46 for enlarging the maxilla of the wearer in left, right and anterior directions. Each of the expansion screws 42, 44, 46 is provided with apertures for receiving a tool (not shown) which is used by an orthodontist or patient to adjust the effective size of the base 12 according to the shape desired in the wearer's maxilla. The base 12 is able to expand in response to adjustment of the expansion screws 42,

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44, 46 by virtue of breaks 47 formed in the base 12 which divide it into three separate panels 48, 50, 52. The effect provided by the expansion screws 42, 44, 46 in this arrangement is advantageous as the arch wire 14 is around the arch 16 and there is nothing grabbing or hurting the teeth 17 as is often the case with conventional previously proposed dental appliances. As such, the present arrangement provides benefits in influencing the nervous system and muscle function of the wearer.

The base 12 has an anterior bite plane 53 which may be formed so as to be either flat or sloped in order to bring the wearer's lower jaw forward when the lower jaw is occluding the bite plane 53 and to relax the wearer's chin and neck muscles. The acrylic base 12 is formed according to the shape desired to be given to the wearer's jaw. The anterior bite plane helps to put the wearer's teeth together so that there is no deep bite and the right amount of bottom teeth are showing. Over time, a deep bite is able to be corrected and clenching is able to be reduced

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The pressure should be gentle and slow, and the widening allows the teeth to be realigned with greater freedom. Such realignment can be directed by the arch wire and by auxiliary wires or springs either soldered to the arch wire or fixed into the acrylic. Slight lateral expansion of premolars and molars if done correctly allows the pressure on cranial sutures to free up allowing jaw restriction to ease to varying extents, thus having a beneficial effect on the nervous system. The bigger the mouth opens the more the entire body relaxes.

Due to the way the acrylic is on the inside and the arch wire is on the outside, teeth can move in 6 directions to achieve harmony. That is forwards and backwards, side to side and up and down.

Use of appliances in accordance with examples of the invention can promote realignment of the wearer's jaws, particularly by encouraging forward movement of the lower jaw, as well as improved ability of the patient to close his/her mouth and to breathe through the nose.

Manufacture of the Appliance

In order to manufacture a dental appliance as described above for a patient, impressions of the patient's jaws are taken, and models of the jaws are made from these impressions. It is desirable for the impressions and models to have a high degree of accuracy such that the appliance can be manufactured to fit well and to work effectively.

The detail should go right back to, and include, the rearmost teeth. Lower impressions require as much of the lingual plate as possible. When impressions are taken using alginate, they must be poured before they dry out. Models can be poured up next day if kept wet. Rubber impressions also can be good. They give the option of several pours, including study models. A new type of alginate, cum rubber, may be a problem solver; it is lighter for posting to laboratories and also less work for the staff. When taking impressions, after selecting a suitable tray for supporting the impression material, the loaded impression should be first pressed in

- 13A -

backwards. This will avoid gagging the patient, and also prevent forcing the material to the back of the throat. Staff should ensure a good mixture, which is not too runny.

Instructions to the Laboratory

- a) There are two basic designs of appliance and some variations. Usually the laboratory is

Amended Sheet
IPEA/AU

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7. A dental appliance as claimed in any one of the preceding claims wherein, when the dental appliance is in use, the arch wire extends continuously from a left side posterior portion of the base, outwardly behind a posterior tooth on the left side of the arch, forwardly along the outside left side of the arch, rightward along the outside front side of the arch, rearwardly along the outside right side of the arch, and inwardly behind a posterior tooth on the right side of the arch to a right side posterior portion of the base.
8. A dental appliance as claimed in any one of the preceding claims, wherein the arch wire incorporates a plurality of U-loops.
9. A dental appliance as claimed in claim 8, wherein the arch wire incorporates four U-loops.
10. A dental appliance as claimed in any one of the preceding claims, wherein the arch wire is provided with one or more C-clasps.
11. A dental appliance as claimed in claim 10, wherein at least one of the C-clasps is coupled to the arch wire at only one end portion of the C-clasp.
12. A dental appliance as claimed in any one of the preceding claims, wherein the arch wire is provided with one or more L-rests.
13. A dental appliance as claimed in any one of the preceding claims, wherein the base is acrylic.
14. A dental appliance as claimed in any one of the preceding claims, wherein the base is provided with a bite plane.
15. A dental appliance as claimed in claim 14, wherein the bite plane is an anterior bite plane.

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16. A dental appliance as claimed in claim 14, wherein the bite plane is a posterior bite plane.
17. A removable dental appliance having a base adapted for locating inside of an arch of teeth of a wearer and an arch wire coupled to the base, wherein an outer surface of the base is contoured for contact with inner surfaces of a set of teeth on one side of the wearer's jaw, when in use the arch wire extends around an outer periphery of the set of teeth such that no interconnection between the arch wire and the base exists intermediate the set of teeth, and the dental appliance has anterior wires or springs for urging forward anterior teeth of the wearer.
18. A removable dental appliance having a base adapted for locating inside of an arch of teeth of a wearer and an arch wire coupled to the base, wherein an outer surface of the base is contoured for contact with inner surfaces of a set of teeth on one side of the wearer's jaw, and wherein when in use the arch wire extends around an outer periphery of the set of teeth such that no interconnection between the arch wire and the base exists intermediate the set of teeth.
19. A dental appliance as claimed in claim 17 or 18, wherein the arch wire extends continuously from a posterior portion of the base, outwardly behind a posterior tooth of said set of teeth, forwardly in contact with outer surfaces of said set of teeth, and inwardly in front of a front tooth of said set of teeth to the base.
20. A dental appliance as claimed in any one of claims 17 to 19, wherein the removable dental appliance is for a lower jaw of the wearer.
21. A dental appliance as claimed in any one of claims 17 to 20, wherein the base has a first lingual portion and an opposed second lingual portion, the first and second lingual portions being held apart by a resilient member, the first lingual portion is contoured for contact with inner surfaces of a first set of teeth on one side of the wearer's jaw and the

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second lingual portion is contoured for contact with inner surfaces of a second set of teeth on an opposite side of the wearer's jaw, and when in use, a first arch wire extends continuously from a posterior portion of the first lingual portion, outwardly behind a posterior tooth of said first set of teeth, forwardly in contact with outer surfaces of said first set of teeth, and inwardly in front of a front tooth of said first set of teeth to the first lingual portion, and a second arch wire extends continuously from a posterior portion of the second lingual portion, outwardly behind a posterior tooth of said second set of teeth, forwardly in contact with outer surfaces of said second set of teeth, and inwardly in front of a front tooth of said second set of teeth to the second lingual portion.

22. A dental appliance as claimed in claim 21, wherein each of the first and second arch wires is provided with one or more C-clasps.
23. A dental appliance as claimed in claim 22, wherein at least one of the C-clasps is coupled to the arch wire at only one end portion of the C-clasp.
24. A dental appliance substantially as hereinbefore described with reference to the accompanying drawings.

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